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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,851

12/29/2005

Ingo Schwirtlich

05158

6404

23338 7590 09/16/2009
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EXAMINER

SENE, PAPE A

ART UNIT

PAPER NUMBER

2812

MAIL DATE

DELIVERY MODE

09/16/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,851	Applicant(s) SCHWIRTLICH ET AL.	
	Examiner PAPE SENE	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims **13, 17-19, 26-28 and 31-33** are rejected under 35 U.S.C. 102(b) as being unpatentable over Lee (U.S. Patent No. 6,406,646) in view of Fukuda (U.S. Patent No. 6,485,855).

13. Referring to claim **13**, Lee discloses a method for constructing a linear and/or punctiform structure on a support, comprising the steps of: applying to the support a flowable, electrically conductive paste-like substance (**paste composition, Col. 1, Ln. 62-65 and Col. 2, Ln. 17-23**) containing a solvent (**Col. 4, Ln. 32-44**); contacting the substance, with a medium containing a polar molecule (**Col. 4, Ln. 45-56, wherein the medium is surfactant**), causing thereby the solvent contained in the substance to be extracted therefrom in an edge region, resulting in a hardening and stabilizing of the substance in the edge region (**Col. 5, Ln. 3-13, wherein drying the coated substrate, extracts the organic solvent contained in the paste composition**).

However, Lee does not specifically disclose that contacting the substance with a medium containing polar molecule, is done after forming the substance.

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Fukuda teaches a method, wherein after forming a conductive paste-like substance (**active solid polymer electrolyte membrane**), the conductive paste is contacted with a medium containing polar molecule (**liquid mixture**), causing thereby the solvent contained in the substance to be extracted therefrom in an edge region, resulting in a hardening and stabilizing of the substance in the edge region (**Col. 2, Ln. 66 – Col 3, Ln. 27**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to contact Lee's conductive paste-like substance applied to a support with Fukuda's medium containing a polar molecule, as taught by Fukuda, for the purpose of carrying out an ion exchange (**Col. 2, Ln. 66 – Col 3, Ln. 27**).

17. Referring to claims **17 and 31**, Lee and Fukuda disclose a method according to claim 13 or 27, and Lee further discloses that the paste-like substance is applied to the support by at least one of screen printing, tampon printing, finger writing techniques or spraying techniques (**Col. 5, Ln. 3-13**).

18. Referring to claims **18 and 32**, Lee and Fukuda disclose a method according to claim 13 or 27, and Lee further discloses that the polar medium is applied to the substance from about 0.1 to about 600 seconds after applying the substance to the support (**Col. 5, Ln. 3-19, wherein the surfactant is applied after drying the substrate**).

19. Referring to claims **19 and 33**, Lee and Fukuda disclose a method according to claim 18 or 32, and Lee further discloses that the polar medium is applied to the substance from about 1 to about 60 seconds after applying the substance to the support (**Col. 5, Ln. 3-19, wherein the surfactant is applied after drying the substrate**).

26. Referring to claim **26**, Lee and Fukuda disclose a method according to claim 13, and Lee further discloses that a concentration gradient between the polar medium and the substance is set with respect to the solvents present in the substance, such that the solvent of the substance is extracted into the medium (**Col. 4, Ln. 45-56, Col. 5, Ln. 3-19, wherein drying the coated substrate, extracts the organic solvent contained in the paste composition**).

27. Referring to claim **27**, Lee discloses a method for constructing a linear and/or punctiform structure on a support, comprising the steps of: applying to the support a flowable, electrically conductive paste-like substance (**paste composition, Col. 1, Ln. 62-65 and Col. 2, Ln. 17-23**) containing a solvent (**Col. 4, Ln. 32-44**); contacting the support with a medium containing a polar molecule (**Col. 4, Ln. 45-51 and 56, wherein the medium is surfactant**), with forces of adhesion between the medium and the support being greater than forces of adhesion between the substance and the support (**Col. 4, Ln. 45-51 and 56 and Col. 1, Ln. 62-65 and Col. 2, Ln. 17-23, wherein surfactant bond much better to a glass substrate than the paste composition**), said contacting thereby substantially preventing flowing of the substance along the

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support and detachment of the substance from the support (**Col. 4, Ln. 45-51 and 56, wherein the medium is surfactant**).

However, Lee does not specifically disclose that contacting the substance with a medium containing polar molecule, is done after forming the substance.

Fukuda teaches a method, wherein after forming a conductive paste-like substance (**active solid polymer electrolyte membrane**), the conductive paste is contacted with a medium containing polar molecule (**liquid mixture**), causing thereby the solvent contained in the substance to be extracted therefrom in an edge region, resulting in a hardening and stabilizing of the substance in the edge region (**Col. 2, Ln. 66 – Col 3, Ln. 27**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to contact Lee's conductive paste-like substance applied to a support with Fukuda's medium containing a polar molecule, as taught by Fukuda, for the purpose of carrying out an ion exchange (**Col. 2, Ln. 66 – Col 3, Ln. 27**).

28. Referring to claim **28**, Lee and Fukuda disclose a method according to claim 27, and Lee further discloses that the polar medium is applied on the support in the form of a liquid or a foam in the region of the applied paste-like substance (**Col. 4, Ln. 45-56**).

15. Referring to claims **15 and 29**, Lee and Fukuda a method according to claim 13 or 27, wherein the polar medium comprises at least one surfactant selected from the group consisting of anionic surfactants, cationic surfactants, non-ionic surfactants, and amphoteric surfactants (**Col. 4, Ln. 45-51 and 56**), and **Fukuda further teaches that** the polar medium comprises a mixture of water and at least one surfactant selected from the group consisting of anionic surfactants, cationic surfactants, non-ionic surfactants, and amphoteric surfactants (**Col. 2, Ln. 66 – Col 3, Ln. 27**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to contact Lee's conductive paste-like substance applied to a support with Fukuda's medium containing a polar molecule, as taught by Fukuda, for the purpose of carrying out an ion exchange.

3. Claims **16, 22, 30 and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 6,406,646) in view of Fukuda (U.S. Patent No. 6,485,855), and in further view of Grolemond (U.S. Patent No. 6,387,997).

16. Referring to claims **16 and 30**, Lee and Fukuda disclose a method according to claim 15 or 29.

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However, Lee and Fukuda do not disclose that the surfactants are selected from the group consisting of soap, fatty alcohol sulfates, alkyl benzene sulfonates, non-carbonic acid ester of polyalcohols.

Grolemund teaches that the surfactants are selected from the group consisting of soap, fatty alcohol sulfates, alkyl benzene sulfonates, non-carbonic acid ester of polyalcohols **(Col. 11, Ln. 46 – Col. 12, Ln. 5)**.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to define Lee's surfactant as taught by Grolemund, for the purpose of achieving the requisite dispersion stability **(Col. 15, Ln. 51-54, Grolemund)**.

22. Referring to claims **22 and 36**, Lee and Fukuda disclose a method according to claim 13 or 27, wherein the substance includes water soluble and water insoluble solvents.

However, Lee and Fukuda do not disclose that water soluble and water insoluble solvents are added to the substance.

Grolemund teaches an electrically conducting paste-like substance containing a solvent **(Col. 15, Ln. 36-50, wherein the substance is the film forming composition, and the solvent is the hydrophilic crosslinking agents)**, wherein water soluble and water insoluble solvents are added to the substance **(Col. 16, Ln. 46-62)**.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, and further include the teaching of Grolemund, for the purpose of adapting the substance to be hydrophilic **(Col. 15, Ln. 51-54, Grolemund)**.

4. Claims **23-24 and 37-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 6,406,646) in view of Fukuda (U.S. Patent No. 6,485,855), and in further view of Kleiner (U.S. Patent No. 4,610,808).

23. Referring to claims **23 and 37**, Lee and Fukuda disclose a method according to claim 13 or 27.

However, Lee and Fukuda do not disclose that the substance is applied to the substrate such that after hardening, the substance has a height to breadth ratio a , where $0.1 \leq a \leq 1.0$.

Kleiner teaches an electrically conducting paste-like substance containing a solvent, wherein the substance is applied such that the substance has a height to breadth ratio a , where $0.1 \leq a \leq 1.0$ **(Col. 5, Ln. 56-60)**.

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It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, to further disclose the teaching of Kleiner, for the purpose of specifying that the low aspect ratio of the substance, when hardened, provides better electrical conductivity (**Abstract and Col. 5, Ln. 32-60, Kleiner**).

24. Referring to claims **24 and 38**, Lee and Fukuda disclose a method according to claim 23 or 37, and Kleiner further teaches that a is about 0.3.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, to further disclose the teaching of Kleiner, for the same reason as above, with respect to claim 23.

5. Claims **25 and 40** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 6,406,646) in view of Fukuda (U.S. Patent No. 6,485,855), and in further view of Kodas (U.S. Patent No. 6,465,550).

25. Referring to claims **25 and 40**, Lee and Fukuda disclose a method according to claim 13 or 27.

However, Kleyer does not specifically disclose that the support is a silicon substrate with a surface layer comprising at least one of silicon oxide and silicon nitride.

Kleyer teaches a method of applying an electrically conducting paste-like substance (**silicone composition, Col. 1, Ln. 6-12**) on a support, wherein a support is a silicon substrate with a surface layer comprising at least one of silicon oxide and silicon nitride (**Col. 9, Ln. 6-11, wherein the support is the substrate**).

It would have been to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, to further disclose the teaching of Kleyer, for the purpose of promoting adhesion to the substrate (**Col. 10, Ln. 44-47, Kleyer**).

6. Claims **14, 20-21, 34-35 and 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 6,406,646) in view of Fukuda (U.S. Patent No. 6,485,855), and in further view of Kodas (U.S. Patent Application Publication No. 2003/0124259).

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14. Referring to claims **14 and 39**, Lee and Fukuda disclose a method according to claim 13 or 27.

However, Lee and Fukuda do not specifically disclose that the support comprises a semiconductor solar cell.

Kodas teaches a method, wherein a paste substance (**precursor**) is applied on a support (**Abstract, [0017] and [0022]**), and wherein the support comprises a semiconductor solar cell (**[0225]**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, and further include the teaching of Kodas, for the purpose of adapting the substance to the solar cell technology.

20. Referring to claims **20 and 34**, Lee and Fukuda disclose a method according to claim 13 or 27.

However, Lee and Fukuda do not specifically disclose that the substance is applied in a circular cross section with a diameter d , where about $15\text{ }\mu\text{m} \leq d \leq$ about $300\text{ }\mu\text{m}$.

Kodas teaches a method, wherein the substance (**precursor**) is applied to the support in a circular cross section with a diameter d , where about $15\text{ }\mu\text{m} \leq d \leq$ about $300\text{ }\mu\text{m}$ (**[0035] and [0196]**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, and further include the teaching of Kodas, for the purpose of enabling formation of features for devices having small average feature size (**[0196]**).

21. Referring to claims **21 and 35**, Lee, Fukuda and Kodas disclose a method according to claim 20 or 34, and Kodas further teaches that d is about $80\text{ }\mu\text{m}$ (**[0035] and [0196]**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made, to modify the disclosure of Lee and Fukuda, and further include the teaching of Kodas, for the same reason as above, with respect to claim 20.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAPE SENE whose telephone number is (571)270-5284. The examiner can normally be reached on 5/4/9.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on (571)272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PAPE SENE/
Examiner, Art Unit 2812

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